WHAT IS CLAIMED IS:

1. An apparatus comprising an integrated circuit having a section which includes:

a resonator portion responsive to electromagnetic radiation within a first frequency range;

a converter portion coupled to said resonator portion, and responsive to radiation received by said resonator portion within said first frequency range for emitting electromagnetic radiation within a second frequency range substantially different from said first frequency range; and

a detector portion responsive to radiation within said second frequency range and disposed in the region of said converter portion, said detector portion detecting radiation emitted by said converter portion within said second frequency range.

2. An apparatus according to Claim 1, wherein said second frequency range includes infrared radiation, and said radiation emitted by said converter portion is infrared radiation.

3. An apparatus according to Claim 2, wherein said first frequency range includes radiation which is substantially lower in frequency than infrared radiation.

4. An apparatus according to Claim 2, wherein said converter portion includes a resistive element which is impedance matched with said resonator portion, and which emits said infrared radiation.

5. An apparatus according to Claim 4, wherein said resonator portion includes spaced first and second antenna elements, and including an amplifier having two inputs and two outputs, said inputs of said amplifier each being coupled to a respective one of said antenna elements, and said outputs of said amplifier each being coupled to a respective end of said resistive element.

6. An apparatus according to Claim 4, wherein said resonator portion includes spaced first and second antenna elements, said resistive element having two ends which are each coupled to a respective one of said antenna elements.

7. An apparatus according to Claim 6, wherein said antenna elements are each approximately triangular, and collectively form a bow-tie antenna.

8. An apparatus according to Claim 1,

wherein said integrated circuit includes a substrate, and structure suspending said detector portion at a location spaced above said substrate;

wherein said converter portion includes a resistive element which is substantially aligned with said detector portion in horizontal directions, and which has two ends; and

wherein said resonator portion includes spaced first and second antenna elements which are each coupled to a respective end of said resistive element.

9. An apparatus according to Claim 8, wherein said resistive element is spaced vertically from said detector portion, and is made of a material which is reflective to radiation in said second frequency range, the space between said detector portion and said resistive element facilitating absorption by said detector portion of radiation in said second frequency range.

10. An apparatus according to Claim 9, wherein said resistive element has a serpentine configuration.

11. An apparatus according to Claim 8, wherein said resistive element and said first and second antenna elements are all supported by said substrate at a location spaced vertically lower than said detector portion.

12. An apparatus according to Claim 8, wherein said resistive element is disposed closely adjacent said detector portion, and said first and second antenna elements are both supported by said substrate at a location spaced vertically from said resistive element.

13. An apparatus according to Claim 12, wherein said first and second antenna elements are vertically lower than said resistive element.

14. An apparatus according to Claim 12, wherein said first and second antenna elements are vertically higher than said resistive element.

15. An apparatus according to Claim 8, wherein said resistive element and said first and second antenna elements are all supported by said substrate at a location spaced vertically higher than said detector portion.

16. An apparatus according to Claim 1, wherein said integrated circuit has a further section which includes:

a further resonator portion responsive to electromagnetic radiation;

a further converter portion coupled to said further resonator portion, and responsive to radiation received by said further resonator portion for emitting electromagnetic radiation within said second frequency range; and

a further detector portion responsive to radiation within said second frequency range and disposed in the region of said further converter portion, said further detector portion detecting radiation emitted by said further converter portion within said second frequency range.

17. An apparatus according to Claim 16, wherein said further resonator portion is responsive to electromagnetic radiation in said first frequency range.

18. An apparatus according to Claim 16, wherein said further resonator portion is responsive to electromagnetic radiation in a frequency range different from said first and second frequency ranges.

19. An apparatus according to Claim 16, wherein said resonator portions have respective different orientations.

20. An apparatus comprising:

a resonator portion responsive to electromagnetic radiation within a selected frequency range which is substantially different from a frequency range of infrared radiation;

a converter portion coupled to said resonator portion, and responsive to radiation received by said resonator portion within said selected frequency range for emitting infrared radiation; and

a detector portion responsive to infrared radiation and which is disposed in the region of said converter portion, said detector portion detecting infrared radiation emitted by said converter portion.

21. An apparatus according to Claim 20, wherein said converter portion includes a resistive element which is impedance matched with said resonator portion and which emits said infrared radiation.

22. An apparatus according to Claim 21, wherein said resonator portion includes spaced first and second antenna elements, and including an amplifier having two inputs and two outputs, said inputs of said amplifier each being coupled to a respective one of said antenna elements, and said outputs of said amplifier each being coupled to a respective end of said resistive element.

23. An apparatus according to Claim 21, wherein said resonator portion includes spaced first and second antenna elements, said resistive element having two ends which are each coupled to a respective one of said antenna elements.

24. An apparatus according to Claim 23, wherein said antenna elements are each approximately triangular, and collectively form a bow-tie antenna.

25. An apparatus according to Claim 20, including:

a further resonator portion responsive to electromagnetic radiation;

a further converter portion coupled to said further resonator portion, and responsive to radiation received by said further resonator portion for emitting infrared radiation; and

a further detector portion responsive to infrared radiation and disposed in the region of said further converter portion, said further detector portion detecting infrared radiation emitted by said further converter portion.

26. An apparatus according to Claim 25, wherein said further resonator portion is responsive to electromagnetic radiation in said selected frequency range.

27. An apparatus according to Claim 25, wherein said further resonator portion is responsive to electromagnetic radiation in a frequency range different from said selected frequency range and different from a frequency range of infrared radiation.

28. An apparatus according to Claim 25, wherein said resonator portions have respective different orientations.

29. A method of operating an apparatus having an integrated circuit with a section which includes a resonator portion, a converter portion coupled to said resonator portion, and a detector portion disposed in the region of said converter portion, comprising:

causing said converter portion to respond to radiation received by said resonator portion within a first frequency range by emitting electromagnetic radiation within a second frequency range substantially different from said first frequency range; and

detecting with said detector portion the radiation emitted by said converter portion within said second frequency range.

30. A method according to Claim 29, including:

selecting said second frequency range to include infrared radiation; and

causing said radiation emitted by said converter portion to be infrared radiation.

31. A method according to Claim 30, including selecting said first frequency range to include radiation which is substantially lower in frequency than infrared radiation.

32. A method according to Claim 31, including configuring said converter portion to include a resistive element which is impedance matched with said resonator portion, and which emits said infrared radiation.

33. A method according to Claim 32, including configuring said resonator portion to include spaced first and second antenna elements, said resistive element having two ends which are each coupled to a respective one of said antenna elements.

34. A method of operating an apparatus having a resonator portion, a converter portion coupled to said resonator portion, and a detector portion disposed in the region of said converter portion, comprising:

causing said converter portion to respond to radiation received by said resonator portion within a selected frequency range by emitting infrared radiation, said selected frequency range being substantially different from a frequency range of infrared radiation; and

detecting with said detector portion the infrared radiation emitted by said converter portion.

35. A method according to Claim 34, including configuring said converter portion to include a resistive element which is impedance matched with said resonator portion and which emits said infrared radiation.

36. A method according to Claim 35, including configuring said resonator portion to include spaced first and second antenna elements, said resistive element having two ends which are each coupled to a respective one of said antenna elements.